

[054] The operation of device 10 is based on the method wherein rotating element 15, having been caused to rotate by means of a drive motor (not shown), the portion of said rotating element 15 situated in the magnetic field generated by magnetic elements 16 loses its entropy as it undergoes a temperature increase. At the same time the first heat-transmitting fluid in circuit 17a, put into motion by first pump [[19]] 23 and circulating in the opposite direction from the second heat-transmitting fluid in second circuit 17b, enters the first compartment 12 at a given temperature T_{c1} and through the intermediary of traversing passageways 25, crosses the portion of rotating element 15 subjected to the increase in temperature. The first heat-transmitting fluid in this portion of rotating element 15 undergoes a temperature increase due to heat transfer. At the outlet of first compartment 12, the temperature T_{c2} of said heat-transmitting fluid is then higher than T_{c1} . The heat-transmitting fluid from heat utility circuit 19 enters first heat exchanger 18 at a temperature T_{cs1} and in turn undergoes a temperature increase due to heat exchange with the first heat-transmitting fluid that has traversed enclosure 11 and has been heated by passing through compartment 12. The fluid from heat utility circuit 19 leaves said first heat exchanger 18 at a temperature T_{cs2} that is higher than temperature T_{cs1} . The heat stored in this heat-transmitting fluid can be used for any application. It can also be simply evacuated into the ambient atmosphere. ✓

1-27. (CANCELED)

28. (CURRENTLY AMENDED) [[The]] A device for generating cold and heat by a magneto-calorific effect, wherein the device comprises:

an enclosure (11) divided into first and second compartments (12, 13) that are juxtaposed and separated from one another by a partition (14), the enclosure (11) comprises a cylindrical portion closely accommodating containing a rotating element (15) which comprises cylindrical shaped wheel that is arranged transversely in relation to the first and second compartments (12, 13) and rotating on an axle located in a plane of the partition (14) so that the rotating element (15) is simultaneously located partially inside the first and second compartments (12, 13), the rotating element is coaxial with the cylindrical portion of the enclosure (11) so that the fluid flows axially through the cylindrical rotating element (15);

a first hot circuit (17a) connected to the first compartment (12) of the enclosure (11) and comprising a first heat exchanger (18) through which a first heat-transmitting fluid circulates, and the first exchanger being connected to a heat utility circuit (19);

a second cold circuit (17b) connected to the second compartment (13) of the enclosure (11) and comprising a second heat exchanger (21) through which a second heat-transmitting fluid circulates, and the second exchanger being connected to a cold utility circuit (22); and

magnetic elements (16) for generating a magnetic field in the first compartment (12), at least in the area corresponding to the rotating element (15), the rotating element (15) comprising at least one magneto-calorific material which undergoes a temperature increase when the rotating element (15) passes through the first compartment (12) subjected to the magnetic field and cools down when the rotating element (15) passes through the second compartment (13) that is not subjected to the magnetic field.

29. (PREVIOUSLY PRESENTED) The device according to claim 28 wherein the magnetic elements (16) comprise permanent magnets.

30. (PREVIOUSLY PRESENTED) The device according to claim 28 wherein the magnetic elements (16) comprise electromagnets.

31. (PREVIOUSLY PRESENTED) The device according to claim 28 wherein the magnetic elements (16) generate a variable magnetic field.

32. (PREVIOUSLY PRESENTED) The device according to claim 28 wherein the device comprises complementary magnetic elements (16a) to create an insulating magnetic field insulating the second compartment (13) from the magnetic field generated by the magnetic elements (16).

33. (PREVIOUSLY PRESENTED) The device according to claim 28 wherein the magnetic elements (16) are movable so the magnetic elements (16) can be located either in a first position (P1) where the magnetic elements (16) generate a magnetic field in one of the first and second compartments (12, 13) or in a second position (P2) where the magnetic elements (16) generate a magnetic field in the other of the first and second compartments (12, 13).

34. (PREVIOUSLY PRESENTED) The device according to claim 30 wherein the magnetic elements (16) comprise first electromagnets for creating a magnetic field in the first compartment (12), second electromagnets for creating a magnetic field in the second compartment (13) and control means for respectively actuating the first or the second electromagnets.

35. (PREVIOUSLY PRESENTED) The device according to claim 28 wherein the first and second heat exchangers (18, 21) are selected from the group consisting of liquid to liquid, liquid to gas, and gas to gas heat exchangers.

36. (PREVIOUSLY PRESENTED) The device according to claim 28 wherein the first hot circuit (17a) comprises a first pump (19), the second cold circuit (17b) comprises a second pump (22) and the first and second pumps make the first and the

second heat-transmitting fluids circulate respectively through each of the first and second compartments (12, 13).

37. (PREVIOUSLY PRESENTED) The device according to claim 28 wherein the rotating element (15) comprises a system of traversing passageways (25), and the traversing passageways (25) allows the first and second heat-transmitting fluids to circulate inside the rotating element.

38. (PREVIOUSLY PRESENTED) The device according to claim 37 wherein the rotating element (15) comprises a unit of stacked discs (30) made of different magneto-calorific materials, each disc comprising a system of traversing passageways (25) communicating with the traversing passageways (25) in the adjacent disc or discs.

39. (PREVIOUSLY PRESENTED) The device according to claim 37 wherein the rotating element (15) comprises a system of hollow overlapping cylindrical elements (40) made of different magneto-calorific materials, each cylindrical element (40) comprising a system of traversing passageways (25).

40. (PREVIOUSLY PRESENTED) The device according to claim 37 wherein the rotating element (15) comprises a system of nested angular sectors (50) made of different magneto-calorific materials, and the angular sectors (50) being insulated from one another by thermally insulating elements (26), and each angular sector comprising a system of traversing passageways (25).

41. (PREVIOUSLY PRESENTED) The device according to claim 37 wherein the rotating element (15) comprises a single cylindrical element made of magneto-calorific material, the cylindrical element comprising a system of traversing passageways (25) opening onto two surfaces.

42. (PREVIOUSLY PRESENTED) The device according to claim 37 wherein the rotating element (15) comprises walled angular sectors (60) containing generally spherical grains (27) consisting of at least one magneto-calorific material, and the traversing passageways (25) are defined by interstices formed between the grains (27).

43 (PREVIOUSLY PRESENTED) The device according to claim 37 wherein the traversing passageways (25) are formed of an alveolar structure.

44. (PREVIOUSLY PRESENTED) The device according to claim 37 wherein the traversing passageways (25) are formed as hollow tubes disposed along the axle of the rotating element (15).

45. (PREVIOUSLY PRESENTED) The device according to claim 37 wherein the traversing passageways (25) are formed as a porous structure.

46. (CANCELED)

47. (NEW) A device for generating cold and heat by a magneto-calorific effect, wherein the device comprises:

an enclosure (11) divided into first and second compartments (12, 13) that are juxtaposed and separated from one another by a partition (14), the enclosure (11) comprises a central cylindrical portion closely accommodating a rotating element (15) which comprises cylindrical shaped wheel that is arranged transversely in relation to the first and second compartments (12, 13) and rotating on an axle located in a plane of the partition (14) so that the rotating element (15) is simultaneously located partially inside the first and second compartments (12, 13), and the rotating element is coaxial with the central cylindrical portion of the enclosure (11) so that the fluid flows axially through the cylindrical rotating element (15);

a first hot circuit (17a) connected to the first compartment (12) of the enclosure (11) and comprising a first heat exchanger (18) through which a first heat-transmitting fluid circulates, and the first exchanger being connected to a heat utility circuit (19);

a second cold circuit (17b) connected to the second compartment (13) of the enclosure (11) and comprising a second heat exchanger (21) through which a second heat-transmitting fluid circulates, and the second exchanger being connected to a cold utility circuit (22); and

magnetic elements (16) for generating a magnetic field in the first compartment (12), at least in the area corresponding to the rotating element (15), the rotating element (15) comprising at least one magneto-calorific material which undergoes a temperature increase when the rotating element (15) passes through the first compartment (12) subjected to the magnetic field and cools down when the rotating element (15) passes through the second compartment (13) that is not subjected to the magnetic field, and the magnetic elements (16) comprise permanent magnets which are fixed in a position and extend only along a half periphery of the central cylindrical portion of the enclosure (11).

48. (NEW) A device for generating cold and heat by a magneto-calorific effect, the device comprising:

an enclosure (11) being divided into first and second compartments (12, 13) that are juxtaposed and separated from one another by a partition (14), the enclosure (11) closely accommodating a cylindrical rotating element (15) arranged transversely in relation to the first and the second compartments (12, 13), the cylindrical rotating element (15) having a plurality of axially arranged traverse passageways (25) therein such that fluid passing through the first and the second compartments (12, 13) passes axially through the cylindrical rotating element (15) via the traverse passageways (25), the cylindrical rotating element (15) rotating on an axle which is coincident with a plane defined by the partition (14) so that the cylindrical rotating element (15) is simultaneously located partially inside the first and the second compartments (12, 13), and the rotating element is coaxial with at least a portion of the enclosure (11);

a first hot circuit (17a) connected to the first compartment (12) of the enclosure (11) and comprising a first heat exchanger (18) through which a first heat-transmitting fluid circulates, and the first exchanger being connected to a heat utility circuit (19);

a second cold circuit (17b) connected to the second compartment (13) of the enclosure (11) and comprising a second heat exchanger (21) through which a second heat-transmitting fluid circulates, and the second exchanger being connected to a cold utility circuit (22);

magnetic elements (16) for generating a magnetic field in the first compartment (12), at least in the area corresponding to the cylindrical rotating element (15);

the cylindrical rotating element (15) comprising at least one magneto-calorific material which undergoes a temperature increase when the cylindrical rotating element (15) passes through the first compartment (12) subjected to the magnetic field and cools down when the cylindrical rotating element (15) passes through the second compartment (13) that is not subjected to the magnetic field; and

the magnetic elements (16) comprise permanent magnets which are fixed in a position only adjacent a periphery of the cylindrical rotating element (15) of only one of the first and the second compartments (12, 13).